

ORIGINAL RESEARCH

Comparative Analysis of the Ketamine-Lidocaine and Fentanyl-Lidocaine in Postoperative Analgesia in Axillary Block in Upper Limb Fractures: An Institutional Based Study

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ABSTRACT

Background: To compare the efficacy of ketamine-lidocaine and fentanyl-lidocaine in postoperative analgesia in axillary block in upper limb fractures. **Materials & Methods:** A total of 40 patients within the age range of 20 to 65 years of ASA group I & II were enrolled. Complete demographic and clinical details of all the patients was obtained. Only those patients were enrolled who were scheduled to undergo upper extremity fractures under the axillary block. Initial monitoring of all the patients was done after entering the operating room. All the subjects were randomly divided into two study groups with 20 patients in each group as follows: Group A: Patients who received 4 mg/kg lidocaine 1% and 50 µg fentanyl, and Group B: Patients who received 4 mg/kg lidocaine 1% and 30 mg ketamine during the axillary block. Once the surgery was complete, patients were transferred to the recovery room, where evaluation of sensory and motor block was done. Postoperative pain was evaluated by visual analogue scale (VAS). All the results were recorded in Microsoft excel sheet followed by statistical analysis. **Results:** Among the patients of group A, mean postoperative VAS pain score was significantly higher at sixteen hours and twenty-four hours postoperatively in comparison to the patients of group B. Total rescue analgesia requirement was significantly higher among patients of group A in comparison to patients of group B. **Conclusion:** For the axillary block, both drugs were beneficial. But compared to ketamine, fentanyl might be a better medication to employ as an adjuvant in the axillary block because of the lower pain intensity and reduced demand for analgesics in the fentanyl group.

Key words: Ketamine, Lidocaine, Fentanyl.

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INTRODUCTION

Several procedures carried out in the emergency department, such as fracture manipulation and tendon repair, require upper limb anaesthesia. Traditionally; this has been achieved using general anaesthesia, intravenous regional anaesthesia (Bier's block), haematoma block, or intra-venous sedation, which all have their own associated problems. Regional anaesthesia, particularly the use of peripheral nerve blocks, allows for localized, targeted anaesthesia for surgical anaesthesia and an adjunct to general anaesthesia for postoperative pain control. Systemic,

generalized adverse effects can be avoided by focusing on a specific anatomical location.^{1, 2} Performing a targeted peripheral nerve block can also be a significant part of a multimodal analgesic approach to reduce opioid use. The benefits of brachial plexus block (BPB) over general anaesthesia include superior intraoperative analgesia, improved postoperative analgesia, lower postoperative opioid requirement, reduced recovery time, lower postoperative complications such as nausea and vomiting, paralytic ileus, deep vein thrombosis etc. all of which favours fast track ambulatory surgery.³

Axillary brachial plexus block is a well-recognised method of achieving upper limb anaesthesia.^{4,5} Hence; the present study was conducted for comparing the efficacy of ketamine-lidocaine and fentanyl-lidocaine in postoperative analgesia in axillary block in upper limb fractures.

MATERIALS & METHODS

The present research aimed of comparing the efficacy of ketamine-lidocaine and fentanyl-lidocaine in postoperative analgesia in axillary block in upper limb fractures was conducted in Department of Anesthesia & Critical Care, World College of Medical Sciences Research and Hospital, Jhajjar, Haryana, India. A total of 40 patients within the age range of 20 to 65 years of ASA group I & II were enrolled. Complete demographic and clinical details of all the patients was obtained. Only those patients were enrolled who were scheduled to undergo upper extremity fractures under the axillary block. Initial monitoring of all the patients was done after entering the operating room. All the subjects were randomly divided into two study groups with 20 patients in each group as follows: Group A: Patients who received 4 mg/kg lidocaine 1% and 50 µg fentanyl, and Group B: Patients who received 4 mg/kg lidocaine 1% and 30 mg ketamine during the axillary block. Placement of all the patients was done in supine position. Arms were abducted and hands were placed behind the head. The axillary area was thoroughly cleaned and draped. An ultrasound machine was used for identification of neural network. Once the block procedure was done, thorough monitoring of all the patients was done for

complications. A pinprick test was performed for assessment of sensory block. Once the sensory and motor block were complete, surgical procedures were started. Once the surgery was complete, patients were transferred to the recovery room, where evaluation of sensory and motor block was done. Postoperative pain was evaluated by visual analogue scale (VAS). All the results were recorded in Microsoft excel sheet followed by statistical analysis. Student t test and chi-square test were used for evaluation of level of significance.

RESULTS

Mean age of the patients of group A and group B was 38.4 years and 35.1 years respectively. Majority proportion of patients of both the study groups were males. Mean time duration of surgical procedure among patients of group A and group B was 63.8 minutes and 60.1 minutes respectively. Among the patients of group A, mean postoperative VAS pain score was significantly higher at sixteen hours and twenty-four hours postoperatively in comparison to the patients of group B. Mean duration of regional analgesia among patients of group A and group B was 335.7 minutes and 342.8 minutes respectively. Mean duration of ulnar sensory block among patients of group A and group B was 235.3 minutes and 259.7 minutes respectively. Mean duration of ulnar motor block among patients of group A and group B was 196.5 minutes and 199.2 minutes respectively. Total rescue analgesia requirement was significantly higher among patients of group A in comparison to patients of group B.

Table 1: Comparison of postoperative pain

Time interval postoperatively	Group A	Group B	p-value
15 minutes	0	0	0.72
30 minutes	0	0	0.39
Two hours	0.12	0.10	0.21
Six hours	1.23	1.36	0.68
Sixteen hours	3.25	1.27	0.00 (Significant)
Twenty-four hours	3.59	1.13	0.00 (Significant)

Table 2: Comparison of analgesic variables

Variables	Group A	Group B	p-value
Duration of regional analgesia (minutes)	335.7	342.8	0.44
Duration of ulnar sensory block (minutes)	235.3	259.7	0.51
Duration of ulnar motor block (minutes)	196.5	199.2	0.82
Total pethidine dose (rescue) (mg)	68.3	39.1	0.00 (Significant)

DISCUSSION

Ketamine is a noncompetitive antagonist of the N-methyl-D aspartate receptor (NMDAR). It is used for premedication, sedation, induction, and maintenance of general anesthesia. Central, regional, and local anesthetic and analgesic properties have been reported for ketamine. Intravenous (IV) administration of low-dose ketamine decreases postoperative opioid use and improves analgesia. Fentanyl is a potent synthetic opioid, which, similar to morphine, produces

analgesia but to a greater extent. This robust pharmacologic agent is typically 50 to 100 times more potent. A dose of only 100 micrograms can produce equivalent analgesia to approximately 10 mg of morphine.⁶⁻⁹ Hence; the present study was conducted for comparing the efficacy of Ketamine-Lidocaine and Fentanyl-Lidocaine in Postoperative Analgesia in Axillary Block in Upper Limb Fractures. Mean age of the patients of group A and group B was 38.4 years and 35.1 years respectively. Majority

proportion of patients of both the study groups were males. Mean time duration of surgical procedure among patients of group A and group B was 63.8 minutes and 60.1 minutes respectively. Among the patients of group A, mean postoperative VAS pain score was significantly higher at sixteen hours and twenty-four hours postoperatively in comparison to the patients of group B. Akhondzadeh R et al were analysed 60 patients and randomly divided into two equal groups (n = 30). The intervention group 1 received lidocaine and fentanyl and the intervention group 2 received lidocaine and ketamine during the axillary block. The severity of pain (VAS) and the mean of received opioid (pethidine) were significantly lower in the fentanyl group 24 hours after the surgery. The duration of postoperative analgesia and the time of the first request for painkiller were longer in the fentanyl group, but there was no significant difference. The severity of pain and analgesic intake in the fentanyl group decreased significantly.¹⁰

Mean duration of regional analgesia among patients of group A and group B was 335.7 minutes and 342.8 minutes respectively. Mean duration of ulnar sensory block among patients of group A and group B was 235.3 minutes and 259.7 minutes respectively. Mean duration of ulnar motor block among patients of group A and group B was 196.5 minutes and 199.2 minutes respectively. Total rescue analgesia requirement was significantly higher among patients of group A in comparison to patients of group B. Zaman B et al compared the effect of ketamine and dexamethasone as additives to lidocaine on duration and onset of axillary block action. Duration of sensory and motor block axillary was significantly higher in lidocaine + dexamethasone group than in lidocaine + ketamine group; it was also significantly higher in lidocaine + ketamine group compared to lidocaine group. However, there was no significant difference in the onset of sensory and motor block axillary between the three groups.¹¹

CONCLUSION

For the axillary block, both drugs were beneficial. But compared to ketamine, fentanyl might be a better

medication to employ as an adjuvant in the axillary block because of the lower pain intensity and reduced demand for analgesics in the fentanyl group.

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